

Town of Warsaw

Low Impact Development

Stormwater Management Policy

Low Impact Development (LID) – An approach to site design and stormwater management that seeks to maintain the site’s pre-development rates and volumes of runoff. LID accomplishes this through the minimization of impervious cover, strategic placement of buildings, pavement and landscaping, and the use of small-scale distributed runoff management features that are collectively called “Integrated Management Practices” (IMPs).

Detention – The collection of runoff in a ponding area, depression, or storage chamber followed by its gradual release through an outlet into a receiving water body. Detention is one way to reduce a site’s peak runoff rate to its pre-development peak rate for the storm event of a given magnitude, but is not an effective way to reduce the runoff volume.

Retention – The collection of runoff in a ponding area or receptacle where it is kept until it soaks into the ground through infiltration. Retention reduces the volume of runoff from a site and can also be effective in reducing the peak runoff rate if the retention volume is sufficiently large.

Time of Concentration (Tc) – The time for runoff to travel from the hydraulically most distant point of the development site to the watershed outlet or study point.

Development plans shall use the Low Impact Development (LID) approach for site design and stormwater management. (See references below.) Development proposals over 2,500 square feet shall include a stormwater management concept plan. This plan shall provide sufficient information to demonstrate the overall stormwater management approach and the existence of an adequate stormwater outfall for the project. This plan shall include, but is not limited to the following information:

Stormwater Concept Plan

- Site area and development proposal
- Site topography (including vegetation)
- Soils information with sufficient geotechnical information to determine infiltration capacity
- On-site and adjacent structures
- On-site and adjacent wells and septic fields
- Floodplains and location of any existing flooding areas on- and off-site
- Wetlands and sensitive environmental areas
- Existing and post-development drainage areas

- Typical lot layout for subdivision
- General type, size, and location of Integrated Management Practices (bioretention, etc)
- General type, size, and location of conventional stormwater management facilities
- Outfall location

Stormwater Site Report

- Description of development
- Description of construction phasing
- Preliminary Stormwater Quantity Calculations using the **LID calculations worksheet**
- Preliminary Stormwater Quality Calculations
- Adequacy of Outfall Calculations
- Site photographic inventory
- Description of on-site vegetation
- Provisions for maintenance of facilities

Applicants are encouraged to contact the Town early in the process of preparing a development proposal so that the level of detail and amount of information provided are consistent with what is needed for the LID plan review process.

The storm water management requirements are as follows:

1. The post-development volume of runoff associated with the 2-year 24-hour storm event shall be no greater than the pre-development volume of runoff associated with that event.
2. The post-development peak runoff rate associated with the 2-year 24-hour storm event shall be no greater than the pre-development peak runoff rate associated with that event.
3. Detention shall not be utilized as a means of providing peak runoff rate control, unless site conditions preclude the use of retention.
4. The Time of Concentration (Tc) for the post-development condition shall be no less than the Tc for the pre-development condition.

Exceptions involving the use of hybrid designs that combine LID and conventional practices shall be permitted consistent with the referenced LID design guidance, if it is shown to the satisfaction of the plan reviewers that site conditions prevent the exclusive use of LID practices.

Acceptable devices for maintaining the pre-development volume of runoff may include but are not limited to: retention, bioretention, infiltration trenches, soil amendments,

increased vegetation density, and any other features that will increase rainfall interception and infiltration.

Applicants shall demonstrate an adequate outfall for the project in accordance with VDCR criteria. When sufficient outfall is not present, the site shall meet the above criteria for the **10-year 24-hour storm event**, in addition to the 2-year 24-hour event.

In areas of flooding or inadequate outfall, additional storage volume may be required. The use of the design charts from the LID design manual (USEPA 1998-b-02) shall be used to calculate the pre- and post-development quantity requirements. Other models may be used upon acceptance by the Town.

Storm Water Quality

The storm water quality requirements will be calculated using the procedures outlined in the VDCR and CBLAD manuals. The use of treatment train approaches, where there are multiple opportunities to filter runoff, are encouraged.

References:

Low Impact Development National Manual. *Low-Impact Development Design Strategies An Integrated Design Approach*. EPA 841-B-00-003. Available on the web at <http://www.epa.gov/owow/nps/urban.html> and via FTP at <ftp://lowimpactdevelopment.org/pub/>

Low Impact Development National Hydrology Manual. *Low-Impact Development Hydrologic Analysis*. EPA 841-B-00-002. Available on the web at <http://www.epa.gov/owow/nps/urban.html> and via FTP at <ftp://lowimpactdevelopment.org/pub/>

NOTE: The appendices to this document include a series of charts which are required to calculate LID storage volumes. They are not currently available in the downloadable version. Contact the Warsaw Town Office for copies the LID Calculations Worksheet, which includes the relevant charts.

LID Calculations Worksheet. Available from the Warsaw Town Office.